

Double Patenting Rejection

Claims 35-39, 46-50, 51-55, 56-60 and 61-64 are provisionally rejected as being unpatentable under the judicially created doctrine of obvious-type double patenting, in view of copending application 09/724,804. Applicants submit that a terminal disclaimer will be provided once the claims are otherwise considered to be allowable, so as to overcome the double patenting rejection.

Claim rejection based upon copending Application 09/724,804

Claims 35-39, 46-50, 51-55, 56-60 and 61-64 stand provisionally rejected under 35 U.S.C. 103(a) as being unpatentable over copending Application 09/724,804 (hereinafter "the `804 application"). In response, Applicants point out that the present application claims priority from a number of applications having a filing date of June 2, 2000, which is the priority date of the `804 application. Because the present application and the `804 application have the same filing date and priority date, it is not believed that the `804 application qualifies as a reference under 35 U.S.C. 102 or 103. This rejection is therefore believed to have been overcome.

Claim rejection based upon Mowry

Claims 35, 46, 50-51 and 55 stand rejected under 35 U.S.C. 102(b) as being anticipated by Mowry, Jr. et al. (U.S. Patent 5,403,040, hereinafter "Mowry"). Applicants respectfully traverse the rejection based upon the following.

Claims 35, 46, 50-51 and 55 recite diffraction gratings having a combination of grating parameters falling within a very specific and narrow set of ranges. Claim 35 recites that the blaze angle be between about 27 and about 39 degrees and the number of grooves per millimeter be approximately $(500 \pm 110) * n$, where n is the index of refraction of the reflective material. Claim 46 recites that the blaze angle be between about 37 and about 40 degrees and the number of grooves per millimeter be approximately $(200 \pm 40) * n$, where n is the index of refraction of the reflective material. Claim 51 recites that the blaze angle be between about 41 and about 44 degrees and the number of grooves per millimeter be approximately $(450 \pm 40) * n$, where n is the index of refraction of the reflective material. Mowry, however, does not show any specific set of parameters of the diffraction grating. Instead, Mowry merely states that each of the diffraction grating parameters may vary considerably. For example, Mowry states that the number of grooves per millimeter may vary anywhere from 3 to 3600, and the blaze angle may vary anywhere from 0 to 45 degrees. Further, though Mowry has a cover material over the grating surface, there is no mention in Mowry as to the value of the index of refraction of the cover material. Therefore, there is no showing that the Mowry diffraction grating meets the grooves per millimeter requirements found in claims 35 $((500 \pm 110) * n)$, 46 $((200 \pm 40) * n)$, and 51 $((450 \pm 40) * n)$. Because Mowry does not show each and every feature of the invention claimed in claims 35, 46, 50-51 and 55, and particularly fails to show a diffraction grating having the specific combination of the specific ranges of diffraction grating parameters claimed, claims 35, 46, 50-51

and 55 and the claims that depend therefrom are unanticipated by and allowable over Mowry.

Claim rejection over Laude

Claims 35, 37, 46, 51, 56-58 and 60-63 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Laude U.S. Patent 5,080,465 (hereinafter "Laude"). In response to the rejection, Applicants respectfully submit the following.

Initially, the claims were generally found to be obvious "since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art." (see page 7). However, Applicants respectfully submit that this passage appearing and relied upon in the Office Action is incorrect as it pertains to the test of nonobviousness. In *In re Aller*, 105 U.S.P.Q. 233 (CCPA, 1955) and in cases following *In re Aller*, courts have stated that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."¹ Applicants respectfully submit this correct passage is entirely different from the incorrect passage relied upon in the Office Action. In applying the incorrect passage, all new ranges, including optimum and workable ranges, only involve routine skill and are therefore obvious. In applying the correct passage, nonobviousness may lie where optimum or workable ranges are discovered by

¹ See *In re Aller*, 105 U.S.P.Q. at 235.

experimentation that is not routine. Further, courts have found nonobviousness where results are new and unexpected. In relying upon the correctly quoted passage and the true test of obviousness, Applicants respectfully submit that the claimed invention is nonobvious based upon the following.

First, the claimed diffraction grating parameters are not reached by routine experimentation. Virtually each step in the design process of the claimed diffraction grating is far from routine. First, there is a small region of design space which must be found where very low polarization dependence and relatively high efficiency create acceptable telecommunication products. Finding these small regions is extremely difficult and accomplished only by laborious diffraction calculation searches. Thereafter, it is extremely difficult to rule different masters in order to achieve the predicted calculated grating parameters. Further, it is very difficult to predict the performance of a covered diffraction grating replica from an uncovered diffraction grating master. Indeed, each step undertaken in arriving at a diffraction grating having the claimed diffraction grating parameters is quite arduous.

Second, the claimed diffraction gratings provide critical and unexpected results. Figures 2-7 show the results for the different diffraction grating gratings claimed. Figure 2, for instance, which corresponds to a diffraction grating having the parameters recited in claims 35-39, shows over 88% efficiency for both the transverse electric polarization state TE and the transverse magnetic polarization state TM over the C-band wavelength range, with a peak efficiency of

approximately 94% for the transverse electric polarization state TE and approximately 92% for the transverse electric polarization state. In contrast, the Laude diffraction grating does not have efficiency measurements for the C-band range, but extrapolations of the measured efficiencies show that the efficiencies to be less than 50% in the C-band wavelength range (see Figure 4 of Laude). Comparisons of efficiencies shows that the claimed wavelength range has an increase in efficiency of at least 40% over the C-band wavelength range.² It cannot be said that an increase in efficiency of at least 40% is not new or that it is expected. Accordingly, Applicants respectfully submit that not only is the discovery of a diffraction grating having the claimed combination of ranges of grating parameters reached by a design process that is far from routine experimentation, but also the results provided by the claimed diffraction grating are new and unexpected.

Further, Applicants respectfully submit that there is no showing or suggestion in Laude for a diffraction grating having the claimed grating parameters, as contended in the Office Action. Laude failing to even show efficiency measurements in the C-band wavelength range is a clear indication of an absence of any teaching for a diffraction grating that is workable in the C-band, much less a diffraction grating having the claimed combination of claimed

²Even comparing the peak efficiencies of the claimed diffraction grating of claims 35-39 over the C-band to the peak efficiency of the Laude diffraction grating between 400nm and 600nm shows an approximately 18% efficiency improvement..

diffractiongratingparameters. Instead, the Laude diffraction grating is adapted for a different range of wavelengths, a different number of channels, etc. Utilization of the claimed combination of the claimed grating parameter ranges cannot occur without a showing or suggestion of same.

Based upon the foregoing, Applicants respectfully submit that claims 35, 37, 46, 51, 56-58 and 60-63 are allowable over the teachings of Laude.

Claim rejection based upon Laude in view of official notice

Claims 59 and 64 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Laude in view of an Official Notice. Applicants respectfully submit that claims 59 and 64 are allowable for at least the same reasons presented above that claims 56 and 61 are allowable, respectively.

Claim rejection based upon Laude in view of Knop

Claims 36, 38, 47-48, 50 and 52-53 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Laude in view of Knop. Applicants respectfully submit that claims 36 and 38 are allowable for the same reasons presented above that claim 35 is allowable; that claims 47-48 and 50 are allowable for the same reasons presented above that claim 46 is allowable; and that claims 52-53 are allowable for the same reasons presented above that claim 51 is allowable.

Claim rejection based upon Laude in view of a second Official Notice

Claims 49, 54, 59 and 64 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Laude in view of an Official Notice relating to the utilization of reflective material. Applicants respectfully submit that claim 49 is allowable for the same reasons presented above that claim 46 is allowable; that claim 54 is allowable for the same reasons presented above that claim 51 is allowable; that claim 59 is allowable for the same reasons presented above that claim 56 is allowable; and that claim 64 allowable for the same reasons presented above that claim 61 is allowable.

Claim rejection based upon Hamel in view of Laude

Claims 101, 103, 112, 117, 122-123, 125-128 and 130-131 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel in view of Laude. Applicants respectfully traverse the rejection based upon the reasons presented above as it pertains to the shortcomings of Laude, and upon the following.

The combination of Hamel and Laude fails to show or suggest the wavelength division device having the claimed diffraction grating ranges. As explained above, Laude fails to show a diffraction grating having the claimed combination of the claimed grating parameters. In fact, Laude fails to even suggest a diffraction grating for use over the C-band, much less a device having a diffraction with the claimed grating parameters that produces the efficiency shown in Figs. 2-7 over the C-band. As stated above, the efficiency results provided by the

device having the claimed diffraction gratings over the C-band is markedly and unexpectedly improved over the efficiency provided by Laude. Further, the design process leading to the discovery of the claimed device involves much more than mere routine experimentation, as explained above. Consequently, the invention of claims 101, 103, 112, 117, 122-123, 125-128 and 130-131 are allowable over Hamel and Laude.

Claim rejection based upon Hamel and Official Notice

claims 114, 119, 124 and 129 stand rejected over Hamel in view of an Official Notice relating to the reflective material. Applicants respectfully submit that claim 114 is allowable for the same reasons presented above that claim 112 is allowable; that claim 119 is allowable for the same reasons presented above that claim 117 is allowable; that claim 124 is allowable for the same reasons presented above that claim 122 is allowable; and that claim 129 allowable for the same reasons presented above that claim 127 is allowable.

Claim rejection based upon Hamel in view of Laude and Knop

Claims 102, 104, 105, 113, 115-116, 118 and 120-121 stand rejected based upon Hamel in view of Laude and Knop. Applicants respectfully submit that claims 102, 104 and 105 are allowable for the same reasons presented above that claim 101 is allowable; that claims 113 and 115-116 are allowable for the same reasons presented above that claim 112 is allowable; and that claims 118 and 120-121 are allowable for the same reasons presented above that claim 117 is allowable.



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34013-28uspt

In view of the above, it is believed that this application is in a condition for allowance, and such a Notice is respectfully requested.

Favorable consideration is respectfully requested.

Respectfully submitted,

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Date: 5-2-03

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